VIET NAM FREIGHT ASSESSMENT GUIDANCE FOR DEVELOPING A NATIONAL GREEN FREIGHT PROGRAM
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ABBREVIATIONS AND ACRONYMS

2W  2-wheelers
ACV  Airports Corporation of Viet Nam
ADB  Asian Development Bank
ASEAN  Association of Southeast Asian Nations
BRT  Bus Rapid Transit
CAA  Clean Air Asia
CCAC  The Climate and Clean Air Coalition
CCAV  The Civil Aviation Authority of Viet Nam
CEP  The Core Environment Program
CO  Carbon Monoxide
$\text{CO}_2$  Carbon Dioxide
DRVN  The Directorate for Roads Viet Nam
DWT  Deadweight Tonnage
EDI  Electronic Data Interchange
FDI  Foreign Direct Investment
GHG  Greenhouse Gas
GIZ  The German Organization for International Cooperation
GMS  Greater Mekong Subregion
GPS  Global Positioning System
HCV  Heavy Commercial Vehicle
HDDI  Heavy-Duty Diesel Initiative
ICCT  The International Council on Clean Transportation
ICD  Inland Container Depot
IGOs  Intergovernmental Organizations
ILS  Instrument Landing System
ICT  Information and Communication Technologies
LCV  Light Commercial Vehicle
NGO  Non-government Organization
NO$_2$  Nitrogen Dioxide
PC  Passenger Car
SO$_2$  Sulphur Dioxide
TSP  Total Suspended Particle
USEPA  The United States Environmental Protection Agency
VOC  Volatile Organic Compound
VR-SB  Ships operate along shore
WB  World Bank
EXECUTIVE SUMMARY

This report presents an analysis and evaluation of the current and prospective of freight sector in Viet Nam, focusing on heavy-duty trucks. It also proposes actions for the development of green freight program in Viet Nam.

Methods of assessment used in this report include administering survey questionnaires to carriers and shippers, interviewing managers, experts and scientists in transportation fields, and reviewing relevant documents and policies related to freight transportation.

According to the results, road transport has the largest share of Viet Nam freight transport performance among air, rail and water. In 2014, road transport accounted for over three-quarters (76.2%) of the total freight transport, based on ton-kilometers. It is however estimated by the government that the share of road in freight transport will decrease to 54.39% by 2020 as the volume will be distributed across other transport modes.

The report also found out that transport enterprises in Viet Nam are generally small and medium-sized, and that most of these enterprises own small number of vehicles, limiting their financial capacity and hampering their productivity. Likewise, a large number of owner-operators, who are not well managed and controlled by the government, dominate the freight industry of Viet Nam.

ESTABLISHING A GREEN FREIGHT DEVELOPMENT PROGRAM IN VIET NAM

The following are the identified advantages and difficulties of implementing green freight development program in Viet Nam, based on stakeholder consultations and analysis of results from the survey:

ADVANTAGES

1. The government has set the development trajectory and formulated solutions in the implementation of green development. Likewise, the Ministry of Transport (MOT) has developed an action plan to develop and promote green transport. This presents an opportunity for the development and formulation of green transport policies.

2. The Green Freight Program was developed and made operational through online transport exchanges, more transparent freight transport transactions, and healthy competition among transport enterprises in Viet Nam.

3. Companies are cognizant of the application of green transport technologies and advanced management practices in fleet management to reduce transport costs and increase competitiveness.
4. A number of international organizations, such as Asian Development Bank (ADB), the World Bank (WB), GIZ and Clean Air Asia, have supported the transport sector with specific action programs, plans, and actions aimed at developing green transport in the region.

DIFFICULTIES
1. There is a lack of policies creating incentives for investments in green transport technologies.
2. Enterprises tend to be small and medium-sized, with limited financial capacity. There is also a lack of a credit mechanism to enable enterprises to borrow funds to upgrade their fleets. In addition, the large number of owner-operators is neither well monitored nor well managed.
3. While the first online transport exchange is now operational, shippers (particularly FDI enterprises) have not joined, limiting its efficiency.
4. Human resources personnel lack training and have not kept pace with the region’s level of expertise.
5. There is a need for significant infrastructure investment to promote the redistribution of some freight activities to other modes of transport aside from road freight transport.

RECOMMENDATIONS FOR THE GREEN FREIGHT DEVELOPMENT PROGRAM IN VIET NAM

Based on the thorough evaluation of existing information and analyses of data gathered from the survey, the following recommendations are made:

1. Establish mechanisms and policies:
   1.1. to encourage transport companies to invest in and use clean fuels and greener vehicles; to manage, monitor and improve the quality of owner-operator services and vehicles;
   1.2. to attract shippers, particularly FDI enterprises involved in online transport trading;
   1.3. to enable transport companies to loan money for investments in green transport technologies, fleet innovation, and the replacement of older, environmentally unsound trucks. These mechanisms should require carriers to submit freight performance data in order to qualify for loans, grants and other financial incentives; and
   1.4. to develop and promote public-private partnership that collects, analyzes and shares freight performance data that details the energy and environmental efficiency of freight operations.

2. Capacitate and train human resources to advance their knowledge in freight and improve the quality of transport management both regionally and globally.
3. Strengthen communication and improve dissemination strategy to raise awareness on the benefits of green transport in the economy and the environment.

4. Appeal to agencies and international organizations to provide support and cooperate with:
   4.1. development of policies aimed at promoting general transport and freight transport towards low-carbon emissions and environmental sustainability;
   4.2. testing of green transport models;
   4.3. exchange of experiences on the development of green transport; and
   4.4. information-sharing and best practices on existing global green freight efforts, programs and policies.

This report has generated important findings in Viet Nam’s freight industry. However, it is important to acknowledge the limitations met during the course of the study. The main challenge encountered in completing this report is the availability of public statistics, which is only up to 2014. Moreover, the survey was subjected to a convenience sampling method based on the respondents recommended by the Directorate for Roads of Viet Nam (DRVN).
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<td></td>
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<td></td>
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1. INTRODUCTION

1.1. BACKGROUND

Heavy-duty diesel engines and equipment, which are used to transport materials, goods and people are significant sources of black carbon, toxics, and greenhouse gases. The World Trade Organization (WTO) predicts that international trade will continue at a high rate, thereby emissions that directly impacts the environment and public health could increase even more. Although projects and programs to improve the efficiency and environmental impact of freight movements are currently being implemented, there is still much work to be done. Green freight programs are seen as one of the most effective tools in reducing harmful pollutants in the environment.

Green freight programs, which are often based on public-private partnerships, help in improving freight sector efficiency while reducing associated impacts on public health and the environment. These programs facilitate the sharing of best practices and performance data, while providing recognition for green efforts and achievements, as well as accelerating investments on green technologies and practices into the sector through financing. Green freight programs provide management tools to better measure and manage costs and help reduce emissions.

In August 2013, the Climate and Clean Air Coalition (CCAC) approved funding for the Heavy-Duty Diesel Initiative (HDDI) to formulate a Global Green Freight Action Plan focused on harmonizing green freight efforts on a global scale, in order to maximize the reduction of black carbon emissions and improve energy efficiency in freight transportation. Considerable progress has been accomplished since then. A Green Freight Steering Group, which includes representatives from US, Canada, the International Council on Clean Transportation (ICCT), Clean Air Asia, Smart Freight Centre, and World Bank was assembled. Likewise, in September 2014, at the UN Climate Summit, 50 organizations including all regions (Latin America, Europe, Africa, Asia, and North America) and stakeholder types (Nation States, NGOs, IGOs, private sector and others) endorsed the Action Plan and committed to support the reduction of black carbon emissions and improve energy efficiency in global freight transportation. Finally, in May 2015, the Action Plan was formally launched at the International Transport Forum Annual Summit in Leipzig, Germany.

On 10 September 2015 in Hanoi, Viet Nam, the Directorate for Roads Viet Nam (DRVN), Clean Air Asia, and the United States Environmental Protection Agency (USEPA), with the support of the CCAC, jointly organized a workshop on “Green Freight Program Development” to introduce the concept of green freight programs and provide a venue for exchanging insights on the opportunities for green freight program development in the country. The development of the green freight program in Viet Nam was also supported by the Core Environment Program and Biodiversity Corridors Initiative of
the Asian Development Bank (ADB-EOC) through a broader regional goal for an environmentally friendly and climate resilient Greater Mekong Subregion (GMS), covering Viet Nam, Thailand, and Lao PDR.

Clean Air Asia worked with CCAC and DRVN in conducting the freight sector assessment for Viet Nam. This report presents the results of the freight sector assessment and provides recommendations for establishing a green freight program in Viet Nam. It also proposes an action plan for developing such a program.

1.2. METHODOLOGY

The project involved the review of the previous and current trends on freight volume, vehicle stock growth, and fleet composition of Viet Nam. Key policies related to freight and logistics were also evaluated to determine existing institutional arrangements in the government.

Moreover, to meet the objectives of this project, a survey was conducted based on the Freight Assessment Blueprint developed by the ICCT for the Climate and Clean Air Coalition (CCAC). The survey included assessment of five major components such as fleet characteristics and operations; vehicle fleet management and maintenance; fuel saving technologies and strategies; emissions reporting; and institutional framework and green freight program planning.

The survey questionnaires were distributed to 22 carriers and six shippers. The questionnaires were constructed to be sector specific to get an overview of freight practices across the sector’s representatives and how a green freight program can address the freight sector’s needs.

Stakeholders’ consultation was conducted with representatives from private sector to acquire deeper insights on current freight transport practices and the decision making process. Similar interviews were also conducted with government representatives to understand the current institutional landscape for green freight and identify what gaps need to be filled.

Results of the survey and interviews are presented in Chapter 3 of this report.

1.3. LIMITATIONS

While this report aimed to get an overview of the freight sector in Viet Nam, certain limitations must be noted. The main challenge encountered in completing this paper is the limited availability of public data on freight such as fleet structure specifically, vehicle stock and load factors, freight transport activities, emission factors, and energy and fuels used by the freight sector. Likewise, public data is limited up to 2014.
This report has generated important findings in Viet Nam’s freight industry. However, it is important to acknowledge the limitations encountered during the course of the study.

It is also important to note that the survey was subjected to a convenience sampling method based on the respondents recommended by the Directorate for Roads of Viet Nam (DRVN). Moreover, as mentioned in Chapter 2, much of Viet Nam’s trucking industry is operated by owner-operator enterprises, which are not registered and generally fall outside of the government net with regard to financial and social contributions. Hence, the data on the actual number of truckers in Viet Nam is not accurate, affecting the sampling of the study. The exact number of owner-operator enterprises is unknown, but is estimated to comprise 50% of total trucks nationwide.

2. OVERVIEW OF VIET NAM’S FREIGHT TRANSPORT SECTOR

2.1. FREIGHT TRANSPORT VOLUME AND ACTIVITY

Table 1 and Figure 1 represent the freight transport volume and activities of the different modes of transport in Viet Nam. Based on statistics obtained from the General Statistics Office of Viet Nam¹, domestic and international freight transport volume increased from 460.15 million tons in 2005 to 1,078.58 million tons in 2014, with an average growth rate of 9.9% per year. Meanwhile, freight activity increased from 100,728.30 million ton-kms in 2005 to 223,151.10 million ton-kms in 2014, with an average growth rate of 9.24% per year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Road</th>
<th>Rail</th>
<th>Inland water</th>
<th>Sea</th>
<th>Air</th>
<th>Total</th>
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<tbody>
<tr>
<td>2005</td>
<td>298.05</td>
<td>8.79</td>
<td>111.15</td>
<td>42.05</td>
<td>0.11</td>
<td>460.15</td>
</tr>
<tr>
<td>2006</td>
<td>338.62</td>
<td>9.15</td>
<td>122.98</td>
<td>42.69</td>
<td>0.12</td>
<td>513.58</td>
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<tr>
<td>2007</td>
<td>403.36</td>
<td>9.05</td>
<td>135.28</td>
<td>48.98</td>
<td>0.13</td>
<td>596.80</td>
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<tr>
<td>2008</td>
<td>455.90</td>
<td>8.48</td>
<td>133.03</td>
<td>55.70</td>
<td>0.13</td>
<td>653.24</td>
</tr>
<tr>
<td>2009</td>
<td>513.63</td>
<td>8.25</td>
<td>137.71</td>
<td>55.79</td>
<td>0.14</td>
<td>715.52</td>
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<tr>
<td>2010</td>
<td>587.01</td>
<td>7.86</td>
<td>144.23</td>
<td>61.59</td>
<td>0.19</td>
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<td>2011</td>
<td>654.13</td>
<td>7.29</td>
<td>160.16</td>
<td>63.90</td>
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<td>885.68</td>
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<td>2012</td>
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<td>6.95</td>
<td>174.39</td>
<td>61.69</td>
<td>0.19</td>
<td>961.13</td>
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<td>2013</td>
<td>763.79</td>
<td>6.53</td>
<td>181.21</td>
<td>58.70</td>
<td>0.18</td>
<td>1010.41</td>
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<td>2014</td>
<td>821.70</td>
<td>7.18</td>
<td>190.60</td>
<td>58.90</td>
<td>0.20</td>
<td>1078.58</td>
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<td>2015</td>
<td>874.028</td>
<td>6.667</td>
<td>202.839</td>
<td>57.400</td>
<td>0.205</td>
<td>1141.14</td>
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**TABLE 1. FREIGHT TRANSPORT VOLUME ACROSS ALL MODES OF TRANSPORTATION (2005-2015)**

**FIGURE 1. FREIGHT TRANSPORT VOLUME AND ACTIVITY OF ALL MODES OF TRANSPORTATIONS (2005-2014)**
Figure 2 shows that in 2014, road accounted for the largest share, 76.2%, of the total freight transport volume; followed by inland water, 17.7%; and sea transport, 5.46%. Air transport accounted for the smallest share of the total freight volume, with only 0.02%. In terms of freight activity, sea transport accounted for the highest share 58.3%; followed by road transport, 21.60%; and inland water, 17.97%. The rail and air transport accounted for a very small share of freight activity, with only 1.93% and 0.24%, respectively.

2.2. MODES OF TRANSPORT

2.2.1. ROAD TRANSPORT

In Viet Nam, road freight transport mostly operates within short distances,\(^2\) supports other modes of transport for the “first and last miles,” and transports on routes where other modes of transport such as rail and inland water cannot operate or are not available. Figure 3 illustrates that from year 2005 to 2014, the volume of road freight transport had an average growth rate of 11.9% per year while freight activity had an average growth rate of 11.8% per year.\(^3\) Road transportation in Viet Nam will be discussed further in Chapter 3.

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\(^2\) Ibid

2.2.2. AIR TRANSPORT

Figure 4 indicates the locations of the airports in Viet Nam. According to the Civil Aviation Authority of Viet Nam (CCAV), Viet Nam is currently operating a fleet of 147 aircrafts\(^4\) across 3 international airports and 22 domestic airports, with 25 domestic air routes and 34 international air routes. From 2015 to 2016, 14 aircrafts were added to the fleet.

In recent years, the Airports Corporation of Viet Nam (ACV) has carried out infrastructure projects to improve the airport capacity and enhance the quality of its service. However, some drawbacks are still present:

1. Many domestic airports are not equipped with support equipment such as night lights, precision landing gear ILS, to name a few. Hence, they are unable to operate at night or in severe weather conditions.
2. Only 40% of the airports are capable of operating small ATR72 or Fokker 70 aircrafts.
3. Commercial services (non-aviation service) are very limited, especially at domestic airports.
4. The size of international airports is small compared to many countries in the region (Figure 5).

![FIGURE 5. TAN SON NHAT AIRPORT-VIET NAM VERSUS OTHER AIRPORTS IN THE REGION](image-url)
Figure 6 shows that the freight volume transported by air increased from 2005 to 2014, with an average growth rate of 6.9% per year. Breaking down the statistics further, the total volume of freight circulated domestically by air transport reached 154 thousand tons; whereas in the first half of 2016, the volume of freight reached 507.4 thousand tons, up by 8.3% over the same period in 2015.5

In terms of the concentration of freight volume, most is on routes connected to the cities of Hanoi, Ho Chi Minh City, Da Nang, and Hai Phong. It can be assumed that the demand for transport via air is high on these locations because these cities are large and are geographically far.

Air transport provides comfortable, efficient, and quick transport services, making it suitable for carriage of freight and passengers over a long distance. Moreover, air transport has high economic value as it provides linkage to major cities and markets around the world.

FIGURE 6. FREIGHT VOLUME AND ACTIVITY TRANSPORTED BY AIR (2005-2014)

2.2.3. RAIL TRANSPORT

Figure 7 compares the freight activity and volume in rail transport from 2005 to 2014. Data gathered from the General Statistics Office show that from 2005 to 2014, the volume of rail freight transport declined from 8.79 million tons to 7.18 million tons, with an average decrease rate of 2.2% per year. On the other hand, the freight activity increased from 2,949.30 million ton-kms to 4,311.50 million ton-kms, with an average growth rate of 4.3% per year.\(^6\)

Rail is the commonly preferred transport mode for heavy and bulk commodities, especially in long-distance freight movements. It is also less dependent on the weather, making it more reliable than other transport modes.

However, in Viet Nam, the current share of rail freight transport is still very small compared to road transport and the growth rate is also low in both freight and passenger transport. Figure 8 depicts the Vietnamese rail map.

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The rail network of Viet Nam has a total length of 3,143 km, including 2,531 km of main lines and 612 km of branches and station lines composed of three types of line sizes: 1,000 mm, 85%; 1,435 mm, 6%; 1,435 mm & 1,000 mm (cage line) 9%. The rail density reaches 7.9 km/1000 km².\(^7\)

Most of Viet Nam’s rail transport were not built to standard gauge (1,435 mm), with 85% of the total lines using the non-standard gauge (1,000 mm). Because it is much narrower than the standard, it limits speed and has a lower weight limit, barring the hauling capacity of the train. In addition, rail transport not being used at its optimum because the cost for transporting freight from the production area to the train station is too high.

### 2.2.4. WATER TRANSPORT

#### INLAND WATER

There are about 2,360 rivers and canals in Viet Nam, with a total length of 41,900 km and an average river density of 0.12 km/km² or 0.59 km/1,000 people. Of the total length of the rivers and canals, about 15,500 km (36% of total length of rivers and canals) has been utilized for inland water transport and 8,353 km has been underutilized. There are about 108 ports and inland water wharves scattered along major rivers and canals.\(^8\)

\(^7\) Final report on adjusting strategy of transport development in Viet Nam to 2020, vision to 2030.

\(^8\) Ibid.
Figure 9 shows that from 2005 to 2014, the freight volume of inland water transport increased from 111.15 million tons to 190.60 million tons, with an average growth rate of 6.2% per year. Similarly, the freight activity increased from 17,999 million ton-kms to 4,099 million ton-kms, with an average annual growth rate of 9.3%.

While inland water transport is low cost and has a larger capacity and flexible service, the speed of transport is very slow, making it unsuitable for transactions where time is an important factor. In addition, inland water transport is sometimes unreliable as it can only be used when the water level is sufficient.

The inland water transport in Viet Nam is mainly used for transport of agricultural products such as rice and other large bulk commodities such as cement, coal, etc., especially in the Mekong and Red River deltas where the water network is longer but has higher quality.

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SEA/OCEAN TRANSPORT

With more than 3,200 km of coastline, Viet Nam currently has 37 seaports, with 166 docks and 350 wharfs, with a total length of about 45,000 m of wharves and capacity of about 350-370 million-tons per year. Port groups have been established and are capable of receiving vessels with the load of up to 100,000 tons in containers. The construction of international gateway ports in key economic zones and wharves in other areas is ongoing.

As illustrated by Figure 10, the volume of sea freight increased from 42.05 million tons in 2005 to 58.90 million tons in 2014, with an average growth of 3.8% per year. Meanwhile, the freight activity increased from 61,872.40 million ton-kms in 2005 to 130,015.50 million ton-kms in 2014, with an average growth rate of 8.6% per year.10

![Figure 10. Freight Volume and Activity Transported by Sea (2005-2014)](image)

10 Ibid.
Conversely, as shown in Figure 11 the market share of import and export goods of Viet Nam’s fleet is only less than 10% (reached 21.4% in 2008). The total volume of freight through seaports in 2015 was 427.3 million tons, up about 15% over 2014.

2.3. VEHICLE STOCK PER MODE OF TRANSPORT

For rail transport, the total number of vehicles is currently 7,561, including 491 locomotives, 6,994 wagons and 76 specialized means.

Meanwhile, inland water transport has 241,782 units, with a total cargo tonnage of 12,042,881 and 486,106 passengers. Vessels are approximately 12.67 years old and has a total machine capacity of 10,486,832 cv. With regards to maritime transport, as per the 2015 statistics of Viet Nam Maritime Administration, Viet Nam’s cargo ship fleet has 1,849 vessels with total tonnage of 7.3 million DWT. Container ships comprised the smallest share, 64 units or 3.5%, which is much lower than the global average proportion of 13%. Subsequently, dry good carriers were 318 units or 17.2%; oil and chemical tankers were 185 units (10.5%), and bulk carrier were 188 units (10.2%).

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11 Final report on adjusting strategy of transport development in Vietnam to 2020, vision to 2030.
Lastly, on air transport, Vietnamese airlines are currently operating 95 aircrafts, 43 units or 45.3% are owned. The average age of the aircraft fleet is 6.6 years (of which: the aircraft fleet of Viet Nam Airlines consists of 80 aircrafts, including: 10 B777, 09 A320, 11 A330-200/300, 32 A321, 02 F70 and 16 ATR72).\textsuperscript{14}

Figure 12 indicates that in 2013, the number of trucks in Viet Nam reached 652,111.\textsuperscript{15} Compared to other modes of transport, truck accounts for the highest freight volume transported.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{Figure12.png}
\caption{Number of units across all modes of transportation in 2013}
\end{figure}

In addition, Figure 13 shows that of the total number of trucks in 2013, 526,546 or 80.74% are under 7 tons; 121,840 or 18.68% are 7 to 10 tons; and the remaining 3,725 or 0.58% are over 20 tons.


2.4. IMPACTS OF ROAD TRANSPORT ACTIVITIES ON THE ENVIRONMENT

The transport sector is one of the major sources of air pollution, particularly in urban areas, where vehicle and human population concentration is the greatest. According to Table 2, of the different transport modes, road transport emits the most greenhouse gases followed by sea transport, with 68.5% and 18.9%, respectively.

<table>
<thead>
<tr>
<th>Mode of transport</th>
<th>2005</th>
<th></th>
<th>2010</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>tCO₂e</td>
<td>%</td>
<td>tCO₂e</td>
<td>%</td>
</tr>
<tr>
<td>Road</td>
<td>15,635,187</td>
<td>67.4</td>
<td>24,560,559</td>
<td>68.5</td>
</tr>
<tr>
<td>Inland water</td>
<td>475,734</td>
<td>2.0</td>
<td>759,976</td>
<td>2.1</td>
</tr>
<tr>
<td>Rail</td>
<td>838,907</td>
<td>3.6</td>
<td>1,340,138</td>
<td>3.7</td>
</tr>
<tr>
<td>Air</td>
<td>1,565,649</td>
<td>6.8</td>
<td>2,410,315</td>
<td>6.8</td>
</tr>
<tr>
<td>Sea</td>
<td>4,694,743</td>
<td>20.2</td>
<td>6,761,252</td>
<td>18.9</td>
</tr>
<tr>
<td>Total</td>
<td>23,210,220</td>
<td>100</td>
<td>35,832,240</td>
<td>100</td>
</tr>
</tbody>
</table>

**TABLE 2. GREENHOUSE GAS EMISSIONS ACROSS ALL MODES OF TRANSPORTATION (2005 AND 2010)**
Figure 14 compares carbon emission released by road vehicles from 2000 to 2010. It shows that the emissions had an annual increase of 2 tons from the periods of time mentioned.

In terms of fuel types, diesel produces more noxious gases and much higher emissions of particulate matter. Figure 15 shows that in 2010, it accounted for 42.7% of the total emissions in Viet Nam, followed by gasoline. It is estimated that diesel fuel consumption will increase from 48% in 2010 to 71% by 2040.\textsuperscript{16}

Various factors affect the amount of emissions produced by motor vehicles, such as vehicle class, weight, age and quality; fuel type; and the terrain traveled, to name a few. Generally speaking, the higher the vehicle’s weight, the higher the emission factor is. Likewise, the cleaner the fuel, the lower the emission factor.

As demonstrated by Figure 16, from 2007-2012, motor vehicles had an annual growth rate of 12% per year. Of which, cars had the highest rate, 17%; followed by motorcycles, 15%; and trucks, 13%. Although trucks had the lowest share in terms of units, Figure 17 shows that it had the highest contribution in emissions. Hence, controlling emissions from freight vehicles is an effective approach to reduce pollutants in the transport sector.
Other factors contributing to the increase of pollutants in the air are poor quality of roads, lack of comprehensive and effective transport planning and policies, unsatisfied travel demand needs, and lack of regard for the traffic law, especially in big cities like Hanoi and Ho Chi Minh City.

Along with the growing economy of Viet Nam is the increasing greenhouse gas emissions across all sectors. At present, the agriculture and energy sectors are the largest contributors of greenhouse gas emissions; as sub-sector of the energy sector, transport sector contributes approximately 22.6% of the total greenhouse gas emissions of the energy sector.18 Previous estimates by the transport sector of Viet Nam show that based on the current trends such as low fuel efficiency and poor quality

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18 See Ministry of Natural Resources and Environment’s “Viet Nam’s first bi-annual biennial report on the United Nations Framework Convention on Climate Change,” 2014
of vehicles, emissions from the transport sector will continue to escalate. Despite the downside in
the aspect of environment, the energy sector is estimated to be the main driver of economy of Viet
Nam.

If interventions are not put into action, greenhouse gas emissions will further aggravate the effects
of climate change on ecosystems and communities. The effects also pose incalculable economic
losses in the long-run.

Despite studies and figures confirming the negative impacts of greenhouse emissions in the
environment, economy and welfare of the population, results of the survey show that shippers and
most transport enterprises regard carbon emissions as unimportant. Six of the respondents showed
little interest in emissions activities and did not require the transport unit to provide a carbon
emissions reports.

3. INDUSTRY STAKEHOLDER PERCEPTIONS

Viet Nam has a total road length of more than 258,200 km. Of which, national highways comprise
18,744 km (7.26%), provincial road, 23,520 km (9.11%), district road, 49,823 km (19.30%); commune
road, 151,187 km (58.55%); urban road, 8,492 km (3.29%), and service road, 6,434 km (2.49%).

Based on the road length data, provincial roads are not enough to cater to the volume of trucks
plying the road. This results to high vehicle density along the road, as depicted in Figure 18, leading to
unnecessarily long transit time, low quality of service and high transport cost. Another factor causing
congestion along the roads of Viet Nam is the poor road quality. Data from the transport sector shows
that the share of high quality roads (grades I and II) is very low, 7.51%; whereas the grades III and IV
roads contribute up to 77.73%. The rest, 14.77%, are low quality roads (grades V and VI).
3.1. TRANSPORT ENTERPRISES (CARRIERS)

A survey involving 22 transport enterprises was conducted to obtain first-hand information on the freight transport sector.

Of the 22 transport enterprises involved in the survey, 65.2% are private companies and 34.8% are joint stock companies. While state-owned transport enterprises were not included in the survey and the number of samples are small, the private companies were able to provide sufficient and vital information about the road transport business.

Overall, most of the transport enterprises in Viet Nam are limited liability companies, operating under the Enterprise Law. The following results were obtained thru the administered survey.

3.1.1. ENTERPRISE PROFILE

EMPLOYEES

Taking note of the number of employees for each of the transport enterprise, survey results showed that most, 31.82%, of the enterprises have 1-10 drivers and 1-10 other employees (Figure 19).

![Figure 19. Proportion of Employees, Drivers Versus Others, in Enterprises Surveyed](image-url)
VEHICLES OWNED

As per Figure 20, 77.3% of the transport enterprises own less than 20 vehicles, which implies that transport enterprises in Viet Nam is generally small to medium scale. Small to medium scale enterprises require close supervision and less capital. However, they are not competitive enough to go head-to-head with large scale enterprises. In most cases, these small enterprises perish when a larger competitor enters the market. In addition, it is more difficult for them to secure financing and loans.

AGE OF VEHICLES

In relation to vehicle age, Figure 21 demonstrates that 94.4% of the vehicles fleet is less than 10 years old, which implies that transport enterprises have constantly procured new units over the years to meet the freight transport demand. Specifically, 18 of the 22 enterprises surveyed owns vehicles that are less than 4 years old. Only 5% of the vehicles in the fleet is over 10 years old.
3.1.2. OVERVIEW OF OPERATIONS

TYPES OF GOODS TRANSPORTED

Figure 22 represents commodities shipped by the transport enterprises. It shows that carriers ship mostly manufactured items and consumer products and agricultural products (processed and unprocessed). These essential goods require fast transit times to meet daily demand and to ensure that the high-quality of the goods is maintained.
Corresponding to that, Table 3 shows that the enterprises use both articulated and rigid trucks. Most of them use trucks for dry, general goods.

![Figure 22. Percentage of goods transported by enterprises, according to type](image)

**TABLE 3. FLEET CHARACTERISTICS OF TRANSPORT ENTERPRISES, ARTICULATED VERSUS RIGID**

<table>
<thead>
<tr>
<th>Type of goods</th>
<th>Dry, general goods</th>
<th>Refrigerated goods</th>
<th>Flatbed transport</th>
<th>Liquid or bulk goods</th>
<th>Refuse, recycling</th>
<th>Container chassis</th>
<th>Specialty or others</th>
<th>Light commercial</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum vehicles</td>
<td>R  A</td>
<td>R  A</td>
<td>R  A</td>
<td>R  A</td>
<td>R  A</td>
<td>R  A</td>
<td>R  A</td>
<td>R  A</td>
<td>R  A</td>
</tr>
<tr>
<td>Proportion (%)</td>
<td>48.9</td>
<td>0.84</td>
<td>0.84</td>
<td>0.42</td>
<td>0.00</td>
<td>2.83</td>
<td>3.36</td>
<td>0.52</td>
<td>0.00</td>
</tr>
</tbody>
</table>

| Industry stakeholder perceptions     | 23 |
Results show that goods are transported based on a domestic consumer demand which validates the average tonnage and engine capacity. Figure 23 illustrates that 50.7% of trucks are 20-tonner and below while less than 7% are trucks that carry over 50 tons.

![Figure 23. Proportion of Vehicles, by Tonnage](image)

**TRANSIT DISTANCE**

Most enterprises’ domestic transport routes were predominantly over short distances. Figure 24 shows that 68.18% of the transport enterprises cover distances between 100-200 kilometers. Only 9.09% of the enterprises travel more than 1000 kilometers.
Based on the computation, vehicles that cover short transport distances of 100 to 300 km have an average of 25 shipments in a month, while vehicles that cover long transport distances of approximately 2,000 km only have an average of four shipments in a month.

**SPEED AND IDLE TIME OF VEHICLES**

During operations, the average speed of vehicles is approximately 50km/h. As shown by Figure 25, half of the transport enterprises surveyed have 11-20% empty mile percentage during operations; 18.2% have 21-30%; and another 18.2% have 1-10%. The rest accounts for enterprises that are not aware of the percentage of empty mile of their vehicles during operations.
OPERATING EXPENSES

About 45.5% of the enterprises said they spent 30-40% of their total operational expenses on fuel. Likewise, 77.3% said only 1-5% is allotted on maintenance. Figure 26 depicts that the maintenance expense is high, considering most of the vehicles in the fleet are 7-10 years old.
3.1.3. FUEL CONSUMPTION AND PERFORMANCE EVALUATION

The enterprises have different ways of evaluating the fuel performance. Based on the survey, 86.36% rely on more traditional methods such as taking notes and comparing weekly reports. Methods that use modern equipment such as GPS tracker and fuel sensor have not been applied by the enterprises. 72.73% of the enterprises that indicated that they evaluate their fuel efficiency and saving have assessed the effects of the fuel-saving efficiency of new technologies. However, they did not specify the methods of monitoring fuel consumptions.

Only 31.82% takes into consideration the payback period of applying fuel-saving methods and technologies. Based on their estimates, payback period is usually two years. Hence, their interest to invest on fuel-saving technologies is not significantly high. The low percentage could be attributed to the lack of effective tools to calculate and monitor payback period.

3.1.4. MEASURES TO REDUCE FUEL CONSUMPTION

Survey results showed that enterprises rely on technological solutions and other strategies in order to address fuel efficiency.

Figure 27 illustrates that most of the transport enterprises, 82.61% are using technology as a measure to reduce fuel consumption. Other measures are inspections and preventive maintenance of vehicles and enforcement of company policies.

![Figure 27. Proportion of Enterprises Using Solutions to Reduce Fuel Consumption](image-url)
TECHNOLOGICAL SOLUTIONS

Further breaking down on the topic of technology as key solution to green freight, Figure 28 shows that various forms of innovation that the enterprises are relying on.

![Figure 28. Proportion of Enterprises Using Technological Solutions](image)

As shown on Figure 29, most of them consider the durability, 3.77 estimated consumption benefits, 3.73; reliability, 3.68; cost, 3.55 and maintenance requirements, 3.50 as very important factors when implementing fuel-saving technology solutions.
While green technologies in the transport sector are necessary, they are usually more expensive as they rely on alternative energy sources. Based on the survey, enterprises are usually willing to invest less than 100 million VND (about less than 5,000 USD) on fuel-saving technologies. Because the enterprises are not willing to spend an amount larger than the aforementioned, investment incentive or concessional credit must be made available to support the green transportation movement.

According to the enterprises, they are willing to closely monitor their fuel consumption and invest on improving the fuel-efficiency of their vehicles if the government will support them by providing incentives such as amicable tax policies, loans with low interest or other financial assistance and funding sources.

Furthermore, the reliability and convenience in operation, maintenance, and repair when applying solutions are important factors that motivate enterprises to invest in green technology. With investment on new vehicles to meet the Euro 3 emission standards, enterprises are expecting vehicle efficiency in Viet Nam, particularly improved fuel quality and vehicle emissions standards. They also expressed their positive opinions on the ongoing fleet management solutions, such as ticket fleet and hybrid vehicles, of the government.
OPERATIONAL STRATEGIES

As shown in Figure 30, when it comes to adopting operational strategies to achieve maximum fuel efficiency, the enterprises essentially place high regard on the estimated fuel consumption benefit, 3.77; demand for human resources/skills, 3.73 and cost, 3.55.

In general, although the enterprises are interested in applying solutions to reduce their fuel consumption, they are not able to do so because of certain limitations.

Apart from quality of vehicles and fuels, the periodic maintenance of vehicles also affect the amount of emissions. The majority of the companies surveyed had fixed maintenance schedules; however, many only maintained vehicles when required such as before or after operations with high load, bad roads, or long trips (Figure 31).
In general, complying with the periodic maintenance will reduce a vehicle’s emission, decrease fuel consumption, lower operating costs and enhance its performance. It also maximizes the lifespan of the vehicle and minimize costly equipment failures.

3.2. SHIPPERS

Among the 6 shipping companies surveyed, 4 are locally owned and the rest are foreign investment. All of which engage in both international and domestic shipping, except one.

In general, the shippers showed low interest in reducing fuel consumption and reducing carbon emissions. The following results were obtained thru the administered survey.

3.2.1. FACTORS AFFECTING SHIPPER’S DECISION

The level of importance of the factors of concern for shippers were measured using a rating scale, of 1-12, where 1 is “least important” and 12 is “the most important.”

Figure 32 shows that majority of them consider effective scheduling and time delivery, with points of 8.13; followed by reliable transport service, 7.75; cost, 7.63; and accurate tracking and tracing, 7.25. Meanwhile, most shippers do not give much consideration to low environmental footprint, 1.88; innovative operations and products, 2.63; and quality of equipment, 3.50.
Aside from the abovementioned however, factors affecting the quality of service of transport enterprises or the carriers must also be taken into consideration. Some of these are the nature of shipment, distance and accessibility, condition of the transport infrastructure, and unprecedented unfavorable conditions.

For example, weather is one very unpredictable factor that can quickly and significantly affect transportation and drive an imbalance of supply and demand throughout the marketplace. Bad weather condition may cause congestion on the road and delay the delivery of shipments. This also translates to increased cost and inefficient business performance.

3.2.2. SHIPPERS’ PERCEPTION ON TRANSPORT ENTERPRISES’ PERFORMANCE

The performance of transport enterprises were measured using a rating scale, of 0-10, where 0 is the “lowest” and 12 is the “highest.”

Based on the response of shippers, transport enterprises fared well in categories that shippers consider the most: efficient time delivery, reliable transport service, cost, accurate tracking, customer service and transparent charges, with points 9.83, 9.50, 9.50, 9.33, 9.17 and 9.17, respectively (Figure 33).
3.2.3. PREFERRED MODE OF SHIPPING

Among the transport modes, water transportation is mostly preferred by the shippers, illustrated Figure 34. While water transportation entails more transit time than the other modes, it delivers heavy and bulky goods at a much cheaper price. It is estimated that for large volume of shipments, water transportation is 30-40% less costly than road transport. In addition, it provides more flexible service.

As mentioned previously, speed of water transportation is very slow, which means this mode of transport is only suitable for commodities where time is not an immediate consideration. Other downside of water transport is the many formalities to be complied with, including customs and excise restrictions in sending shipments. In Viet Nam, both water and rail transportation goes through intermediaries which affect the processing of requirements for shipments.

For far-flung areas in Viet Nam such as the Central Highlands and North West, shipping commodities is not ideal because the transshipment cost is high. Meanwhile, port-to-port transport and warehouse-to-warehouse transport are still limited in Viet Nam.
The survey data showed that in the past years, many shippers mainly ship goods for construction materials, vehicles/heavy equipment (Figure 35). In terms of average delivery frequency for the shipping options, outbound has shipments twice per month while inbound has 6-10 shipments per month.
4. INSTITUTIONAL ANALYSIS

4.1. GOVERNMENT INSTITUTIONS

Government institutions in the central, city/provincial, and local levels are involved in the planning and management of the transport sector in Viet Nam.

In particular, the Ministry of Transport is responsible for the planning, construction, and maintenance of transport infrastructure at national level. This includes road, rail, inland water, sea and air transport, as stipulated in Decree No. 107/2012 / ND-CP dated December 20, 2012. It is also tasked to formulate policies, regulations and standards in the transportation sector.

The responsibilities of the Ministry of Transport also extend to supporting local authorities in selecting projects. The Ministry of Transport prepares long-term transport strategy and five-year investment programs and receives the funding from the state budget every year.

TASK AND POWERS OF THE MINISTRY OF TRANSPORT

The following are tasks and powers of the Ministry of Transport which are related to green freight transport, according to Decree No. 12/2017/ND-CP:¹⁹

“5. Regarding road, rail, inland waterway, sea and air transport infrastructure:

a) To direct the implementation of master plans and plans on development of transport infrastructure, already approved by the Prime Minister;
b) To promulgate construction regulations (except for urban transport infrastructure construction regulations) and regulate transport infrastructure management according to its competence; to prescribe the maintenance, use management and exploitation of transport infrastructure in nationwide; to direct and examine the maintenance and observance of standards and technical regulations on, the network of operating transport work under its management;
c) To perform the tasks and exercise the powers of the investment decider and owner, for investment projects on transport infrastructure construction; to announce the list of transport infrastructure projects calling for investment and their investment forms according to law;

¹⁹ See Decree No. 12/2017/ND-CP signed on February 10, 2017 by the Prime Minister on defining the functions, tasks, powers and organizational structure of the Ministry of Transport
d) To propose the Government to prescribe the scopes of inland waterway protection corridors and road and railway traffic safety corridors according to law; to direct and examine People's Committees of all levels in taking measures to protect traffic safety corridors;

e) To announce and direct the opening and closure of airports and airfields and the establishment of air routes after being permitted by the Prime Minister; to decide on temporary closure and reopening of airports and airfields; to announce the closure and opening of sea ports, seaport water areas, seaways, ports and inland wharfs which receive foreign waterway means of transport, inland waterways, railway stations and rail routes according to law;

f) To organize the registration and grant of airport and airfield registration certificates according to law;

g) To propose the Government to prescribe the classification and naming or cording of roads, and technical standards on roads of all grades; to decide on the classification and adjustment of national highway systems; to provide specific guidance on the naming or coding of roads.”

(Decree No. 12/2017/ND-CP, Article 2, Item 5)

“6. Regarding means of transport, construction and loading/unloading means and equipment (other than means used for defense and security purposes, and fishing vessels) and technical equipment used exclusively in transport:

a) To organize the registration of ships and aircraft according to the Government’s regulations; to prescribe the registration and grant of number plates for railway and inland waterway means of transport as well as vehicular machines in traffic;

b) To prescribe motor vehicles’ technical safety and environmental protection quality;

c) To prescribe and guide the implementation of standards and technical regulations on, and the inspection of technical safety quality of, road transport motor vehicles, rail, inland waterway, air and sea means of transport, special-use loading/unloading and construction equipment, and special-use works, means and equipment for transport and other purposes according to law;

d) To organize the grant of certificates of satisfaction of aviation conditions for aircraft, and overseas aviation conditions for to-be-exported aircraft, aircraft engines and propellers; to grant or recognize certificates of category for domestic or imported aircraft, aircraft engines and propellers;

e) To prescribe the appraisal of technical design in production, assembly, repair and transformation of means of transport, special-use loading/unloading and construction equipment and means, and specialized transport technical equipment;

f) To prescribe standards and technical regulations and operation conditions for establishments designing, manufacturing, maintaining or testing aircraft, aircraft engines, propellers and interior equipment in Viet Nam; and establishments providing aviation services or appraising technical safety and environmental protection quality of motor vehicles, and rail, inland
waterway, sea and air means of transport and other means, equipment and works according to law.” (Decree No. 12/2017/ND-CP, Article 2, Item 6)

“7. To prescribe the training, coaching and examination of, and the grant, recognition and withdrawal of professional permits, diplomas and certificates for, drivers and operators of special-use means of and equipment (except for those operating special-use defense and security equipment and means and fishing vessels) or those performing peculiar jobs in the transport sector.” (Decree No. 12/2017/ND-CP, Article 2, Item 7)

“8. Regarding road, rail, inland waterway, sea, air and multi-air and modal transportation:

a) To guide and examine the observance of transport business conditions and mechanisms and policies on transport development and transport-related services according to the Government’s regulations;

b) To prescribe technical and technological standards and regulations on transport operation and exploitation;

c) To announce civil flight routes after they are approved by the Prime Minister; to announce road, rail and inland waterway transport routes and mass transit networks according to law;

d) To guide the multi-modal transportation according to the Government’s regulations;

e) To organize the grant of permits for civil flight operation; to guide and examine the implementation of the regulation on coordination in civil aviation management;

f) To detail the management of activities in airports, airfields, seaports, ports, inland wharfs, railroad stations and railway, inland waterways and seaways.” (Decree No. 12/2017/ND-CP, Article 2, Item 8)

“14. Regarding enterprises, cooperatives:

a) To promulgate or submit to the competent authorities to formulate schemes and policies to support the development of enterprise, cooperatives in the transport sector; and cooperate with relative agencies, organizations to direct, guide, examine the implementation;

b) To approve or submit to the competent authorities to approve the overall schemes of restructure, renovation and state-owned enterprise’s development in the transport sector; and direct to implement under assignment and decentralization;

c) To guide and examine the implementation the business, service conditions regulations and handle violations under its competence;

d) To exercise the rights, responsibilities and obligations of the owner of State for State Enterprises and State equity investments in other businesses according to law.” (Decree No. 12/2017/ND-CP, Article 2, Item 14)
ORGANIZATIONAL STRUCTURE OF THE MINISTRY OF TRANSPORT

The technical, administrative, and other scope of work of the Ministry of Transport is divided into various agencies, departments, schools and enterprises (Figure 36). Under the Ministry of Transport, departments/sub-departments in charge of ports, inland waterways, national highways, railways and airports operate independently or “separately” when mobilizing, deploying and operating transport infrastructure projects. Projects that require multi-sectoral planning are often broken down into sub-projects to be assigned in each unit. This type of fragmented planning has led to, in some cases, sub-projects that have not been coordinated synchronously, affecting the quality and progress of freight transport.

FIGURE 36. ORGANIZATIONS UNDER THE MINISTRY OF TRANSPORT

The units under the Ministry of Transport directly related to green freight transport are the following:

1. The Department of Transport which has overall responsibility for the coordination of transport planning. Under the department are other entities that manage the road network. 21
2. The Environment Department which is responsible for advising the Minister of Transport on managing and protecting the environment.
3. The Viet Nam Register which is responsible for vehicle safety standards and inspections.
4. The Directorate for Road of Viet Nam is responsible for institutional reform and modernization in Viet Nam’s transportation sector. 22
5. The Institute of Transport Development and Strategy that often acts as the lead ministerial entity in dealing with road traffic safety policy and issues. 23

Aside from the units, the Ministry of Transport also coordinates with other central ministries such as the Ministry of Industry, which usually covers the management of the automobile industry such as guiding vehicle manufacturers in observing technical regulations and norms on energy consumption; the Ministry of Infrastructure which often takes on transportation policy; The Ministry of Natural Resources and environment which is responsible for the National Inventory on Greenhouse Gas Emissions and providing guidance for implementation of resource use and environmental protection; the Ministry of Science and Technology which announces national standards on energy yield for vehicles and environmentally friendly fuels used in transport; and the Ministry of Finance which sets taxes, charges, fees and other state budget revenues, funds and investments.

4.2 BUSINESS ORGANIZATIONS

As of March 2012, there are 2,681 enterprises and 586 cooperatives of automobile transport. According to the survey, the number of private enterprises accounted for 65.2% and the number of joint-stock enterprises accounted for 34.8%. All the state-owned transport enterprises were transformed into joint-stock enterprises.

To date, Viet Nam does not have any trans-Viet Nam carriers, most carriers still have small scale; use old motor vehicles; lack maintenance; and have drivers with generally unfriendly behaviors. According to a report published by the World Bank, 24 few transport enterprises meet the needs of logistics service units. Likewise, majority of enterprises of road transport are using old trucks with

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no GPS devices to track the freight journey. The trucks, which are often poorly maintained causes high level of environmental pollution and low efficiency in reducing the loss or damage to cargoes/containers.

4.2.2. LOGISTICS ENTERPRISES

According to statistics of Viet Nam Logistics Association in December 2015, there are approximately 1300 active logistics enterprises, including foreign-invested enterprises, most of which are located in Ho Chi Minh City and Hanoi.

The logistics services of Viet Nam can be classified as follows:

1. Transport operators
2. Enterprises exploiting infrastructure at nodes (ports, airports, stations, etc.)
3. Enterprises exploiting warehouses, loading-unloading, and logistics services
4. Freight forward enterprises, 3PL enterprises and other enterprises such as logistics software solutions, consulting, inspection, appraisal, finance, etc.

Enterprises that provide logistics services in Viet Nam are primarily agents, or undertake each stage as subcontractors in logistics line of international logistics service providers. There are about 25 multinational logistics service enterprises operating in Viet Nam. However, they account for 70-80% of the total market share. The rest are domestic small and medium-size enterprises, having an average chartered capital of VND 4-6 billion.

The logistics service in Viet Nam is rising fast. The sector’s annual growth rate has reached 16 to 20% in recent years. For 2011, the logistics cost in Viet Nam reached 20 to 25% of its GDP, relatively higher compared to those of China, 17.8% and Singapore, 9%. Moreover, the link between import-export enterprises and logistics service enterprises is limited, not tight and reliable.

In terms of transport in logistic operations, enterprises often use a flexible and diverse forms of transport in logistics operations. Many enterprises use simultaneous methods such as trucks-aircrafts or trucks-ships.
About 80% of ships have smaller transport capacity than 50,000 DWT, relatively lower compared to other countries in the world. Truck is the main freight transport vehicle (81.8%) followed by aircrafts (72.7%) and ships (63.6%). The number of enterprises transporting freight by trains and barges is very little.\(^{26}\)

In terms of amount of freight volume, trucks account for the largest share, approximately transporting 75.7% of goods; 17.9% by barge, 5.8% by sea; and 2% by train. The remaining is transported by aircraft. It is predicted that by 2030, trucks will remain the dominant means of transport, accounting for less than 57%, followed by barges 35%; trains, 4%; and ships 3%; and aircrafts 0.03%.\(^{27}\)

Most vehicles used by the enterprises rely on mineral fuel. Few use new energy sources or trams to transport goods in Viet Nam.

**CHALLENGES IN PROMOTING GREEN TRANSPORT IN THE LOGISTICS SECTOR**

The logistics sector of Viet Nam faces many challenges at present. As previously mentioned, most domestic enterprise are small and medium scale, with limited financial capacity and human resource. Only 5 to 7 percent of workers are well trained while the remaining are in need of training after being employed by the enterprises.

In general, Viet Nam has underdeveloped logistics infrastructure and inadequate transport infrastructure, which results in a relative high cost. Warehouses are not user-friendly, meaning the quality is poor and is not at par with international standard. In addition, warehouse planning has not been optimized, leading to ineffective operations. Also, many transport means, particularly trucks, are rudimentary, and obsolete. Most of them rely on mineral fuel resources, causing environmental pollution.

The use of technology to track deliveries and exchanges had also not been maximized, resulting to lack of reliability of Viet Nam’s service. According to the survey\(^{28}\), only 18.2% of enterprises use the global positioning system GPS to locate transport and 36.4% of enterprise use the electronic customs declaration system. 54.5% of surveyed enterprises use ITC system to determine the transport route and 63.6% of businesses use for the purpose of inventory control and warehousing of business.

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\(^{26}\) Vu Anh Dung. Logistics infrastructure with the implementation of green supply chain of enterprises. Viet Nam-Japan University. Viet Nam National University, Hanoi.

\(^{27}\) Ibid.

\(^{28}\) Ibid.
Lastly, one of the biggest limitations to the development of logistics services in Viet Nam is the administrative. The customs processes are deemed ineffective. Viet Nam is currently modernizing their processes using Electronic Data Interchange (EDI) to send and receive data between business logistics and custom. However, recent reports claim that this had not produced satisfying results. There is a lack of reliability throughout the process, creating an unhealthy and nontransparent logistics service environment.

In summary, enhancing customs, infrastructure, and use of technology are seen as conducive for the development of Viet Nam’s logistics sector.

4.2.3. AUTOMOBILE ENTERPRISES

The automobile sector of Viet Nam is composed of international and domestic companies. International companies include those from Europe, USA, Japan and Korea. Few of the many active local companies are Truong Hai Automobile Joint Stock Company (Thaco) and Thanh Cong Hyundai Joint Stock Company, etc.

From 2001 to 2014, the average growth rate of automotive production and assembly reached 17% per year. For 2010, 184,813 vehicles were sold; 181,545 in 2011; 124,815 in 2012; 153,199 in 2013; 241,178 in 2014; and 350,000 in 2015. The production and consumption of automobiles were greatly affected by the fluctuations in the economy and changes in policies, especially policies on taxes and fees.

In 2015, the automotive manufacturing industry of Viet Nam had over 400 enterprises, concentrated mainly in the area of the South East and the Red River Delta. The total designed assembly capacity is around 460,000 vehicles per year, including most types of cars (with a capacity of 200 thousand units per year), trucks and buses (capacity of around 215 thousand units per year). The number of cars fulfills about 68% of the demand, of which 94% meets passenger car and 74% meets the truck.

Of the total designed assembly capacity, 47% were from foreign investment and 53% were from domestic investment.

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At present, the automobile industry in Viet Nam relies heavily on imported accessories and materials. Up to 80% - 90% of core materials to produce parts such as alloy steel, aluminum alloy, plastic beads, and high-technical rubber are imported. Even the casting and main molding materials are imported because those produced in Viet Nam has a poor quality and a high defect rate. 

Most of the domestic components are in the form of simple, low value technology, mainly used for trucks and coaches. These are the components of the chassis of the vehicle, trunk, cabin cover - car door, tires, mirrors, glass, seats, wires, brakes, batteries, gearboxes, exhaust pipes, shafts, rims wheels, tweezers, water gutters, radiators, steering wheels, composite parts, etc.

CHALLENGES IN PROMOTING GREEN TRANSPORT IN THE AUTOMOBILE SECTOR

Viet Nam has promulgated a number of policies to prioritize the development of environmentally-friendly vehicles. However, up until now, many of the domestically produced and assembled automobiles in Viet Nam are using the internal combustion engine with traditional oil and gasoline fuels. This is due to the fact that manufacturing green automobiles require technical skills that are yet to be acquired by the local manufacturers.

Representatives of Toyota Motor Viet Nam said it has provided about 10 million hybrid vehicles globally, has helped to reduce emissions of about 77 million tons of CO$_2$ and saved about 29 billion liters of gasoline. By 2050, Toyota aims to cut 90% of CO$_2$ emissions from new vehicles compared with 2010.

Still, according to statistics from the Viet Nam Register, environmentally friendly vehicles in Viet Nam are limited and mostly imported. From 2010 to present, there are only about 1,229 hybrid cars and 7 electric cars in Viet Nam market.

The underdeveloped supporting industries is one of the biggest hurdles in the progress of the industry. Because manufacturers have to import most of the automobile’s parts, the cost of production is high.
Close cooperation among automakers, assemblers, and parts suppliers have not been established yet. Likewise, a system of large-sized material suppliers, and components and parts producers have not been formed yet, resulting to low rate of localization and inability to participate in the global value chain.

In addition, due to inappropriate policies and high taxes, producers that want to enter the market of Viet Nam are restricted.

It is necessary to continue to formulate policies to support and promote the domestic enterprises for the development of Viet Nam’s automobile industry. Moreover, there is a need to strengthen the legal basis of automobiles to encourage manufacturers to produce more eco-friendly units. This would concretize the regulations on special consumption tax.

4.3. OTHER INSTITUTIONS

Enumerated below are other institutions working on the development of green freight transportation in Viet Nam: 4.3.1 Non-governmental Organizations and Association:

1. Viet Nam Clean Air Partnership (VCAP): mobilizes individuals and organizations to participate in activities which improve air quality, protect public health and promote the country’s sustainable development
2. Vietnamese Non-governmental Organizations and Climate Change (VNGO&CC): facilitates work between international non-governmental organizations in Viet Nam
3. VUFO-NGO Resource Centre Viet Nam: facilitates work between international non-governmental organizations in Viet Nam to improve operational efficiency and enhance the impact and contribution of Vietnamese NGOs in response to climate change.
4. Viet Nam Automobiles Manufacturing Association (VAMA): supports automobiles in terms of policy making, science and technology application, environment protection activities/ regulations, tracking monthly sales and international relations.
5. Viet Nam Automobile Transportation Association (VATA): gathers members and contributes to the sustainable development of the transport sector of Viet Nam.
6. Viet Nam Logistics Business Association (VLA): helps members who operate in the freight forwarding and trade logistics industry in developing professional activities, improving business efficiency, and protecting the legal interest of the members
7. Universities of Technology (in Hanoi, Ho Chi Minh City, Da Nang) and Universities of Transport (in Hanoi, Ho Chi Minh City): carryout and collaborate in researches related to green transportation.
5. POLICY DIRECTION OF VIET NAM TOWARD GREEN FREIGHT TRANSPORT

5.1. LAWS IMPLEMENTED

Over the past years, the Vietnamese government has issued many policies related to green growth and green transport development and sustainability.

The Law on economical and efficient use of energy No. 50/2010/QH12 issued by the National Assembly.32

“Chapter IV, Article 19:
1. Organizations and individuals are encouraged to provide consultancy on and design and invest in the development of mass transit networks: manufacture and use energy-saving vehicles; exploit and expand the application of liquefied gas, natural gas, electricity, mixed fuels and biofuels in replacement of petrol and oil.
2. Transport service providers shall select and take the following measures:
   a. Optimizing transport routes and vehicles in order to raise energy use efficiency;
   b. Elaborating and applying regulations on maintenance and repair of vehicles under their management to reduce fuel consumption
   c. Applying technological, managerial and organizational solutions to transport for economical and efficient use of energy.
3. When building or upgrading transport works, investors and contractors shall:
   a. Apply solutions for economical and efficient use of energy under approved projects;
   b. Apply measures for economical and efficient use of energy to work construction.”

“Chapter IV, Article 20:
1. Manufacturers of transport equipment and vehicles shall:
   a. Observe technical regulations and norms on energy consumption promulgated by competent state agencies in the manufacture of transport equipment and vehicles;
   b. Apply advanced technologies; enhance research and manufacture of transport equipment and vehicles which save energy, use clean fuels, renewable energy and other substitute fuels.
2. Importers of transport equipment and vehicles shall observe regulations on energy use norms promulgated by competent state agencies.”

32 See Law on economical and efficient use of energy No. 50/2010/QH12 issued by the National Assembly on June 17, 2010.
The Law on Environmental Protection No. 55/2014/QH13 issued by the National Assembly on June 23, 2014.33

“Article 74. Environmental Protection in Transport:
1. Traffic planning must comply with regulations on environmental protection.
2. Motorized traffic means must be put into use by the registration agency for certification of environmental technical standards.
3. Means of transportation of raw materials, materials and wastes must be covered, not to fall, causing environmental pollution while participating in traffic.
4. Organizations and individuals engaged in communication and transportation of dangerous goods must fully satisfy the conditions and capability for environmental protection according to the provisions of law.
5. The transportation of goods and materials which are likely to cause environmental incidents must meet the following requirements:
   a. Use of equipment, specialized vehicles, ensuring no leakage, dispersion p UO ng;
   b. permits transport of the governing body of state jurisdiction;
   c. The transportation must follow the route and time specified in the permit.”

Decision No. 1393/QD-TTg, issued by the Prime Minister, dated September 25, 2012 approved the national strategy on green growth for the period (GGAP) 2011- 2020 with vision to 2050.34

“2. Objectives

a) General objectives
Green growth, towards the low-carbon economy, natural capital enrichment has become a decisive tendency in sustainable economic development; reduction in emissions and increase in the possibility to absorb greenhouse gases is becoming mandatory and important targets in socio-economic development.

b) Specific target
- Restructuring and improving economic institutions towards greening of existing sectors and encouraging development of economic sectors efficiently using energy and natural resources with high added value;
- Studying and applying increasingly the advanced technology to use natural resources more efficiently and reduce the intensity of greenhouse gas emissions, contribute to an effective response to climate change;
- Improving people’s lives, building environmentally friendly lifestyle through creating more jobs from industrial and agricultural, green services, investing in natural capital, green infrastructure development.”

33 See Law on Environmental Protection No. 55/2014/QH13 issued by the National Assembly on June 23, 2014.
34 See Prime Minister’s Decision No.1393/QD-TTg dated September 25, 2012 approving the national strategy for green growth.
Under the Decision’s Strategic Tasks, the following criteria, specifically for the purpose of reducing the intensity of greenhouse gas emissions and boosting the use of clean energy, renewable energy, are stated.

“Period 2011 - 2020: Reducing greenhouse gas emissions intensity by 8 - 10% compared to 2010, reducing energy consumption on GDP by 1 - 1.5% per year. Reducing greenhouse gas emissions in the energy activity from 10% to 20% compared with the normal development plan in which the voluntary level of about 10%, the remaining 10% of striving level upon having more international support.

Orientation to 2030: Reducing greenhouse gas emissions each year at least 1.5 - 2%, reducing greenhouse gas emissions in the energy activities from 20% to 30% compared with the normal development plan in which the voluntary level is about 20%, the remaining 10% is the level upon international support.

Orientation to 2050: Reducing greenhouse gas emissions each year by 1.5 - 2%.”

Likewise, during the 21st Meeting of the Parties to the United Nations Framework Convention on Climate Change (COP21), Viet Nam has committed to cut 8% of its total greenhouse gas emissions, fully aligning with the national green growth strategy.

Decision No. 403/QD-TTg issued by the Prime Minister, dated March 20, 2014, approving the National Action Plan on green growth phase from 2014 to 2020.35

“For Main Themes:
1. Setting up institutions and formulating green growth action plans at the local level
2. Reducing the intensity of GHG emissions and promoting the use of clean and renewable sources of energy
3. Greening production
4. Greening lifestyle and promoting sustainable consumption
Decision No. 1456/QD-BGTVT MOT, dated May 11, 2016, promulgating action plan to respond to climate change and green growth of the Ministry of Transport in 2016-2020 period. It has an overall objective of actively developing the transport toward uniform, sustainable, environmentally-friendly direction and reducing greenhouse gas emissions.

Aside from the above mentioned policies, the Government has issued and implemented a strategy to restructure the transport sector in order to develop harmonized and sustainable transport towards modernization on the basis of maximizing the advantages of each mode of transport, improving the quality of services, reducing transport costs, ensuring traffic order and safety, promoting the development of multi-modal transport on the transport corridors, raising the international transport capacity, meeting the needs of economic and social development in service of the cause of national industrialization and modernizing and creating a breakthrough in transport infrastructure. The decisions related to the transport sector development orientation include:

1. **Decision No. 355/QD-TTg of February 25, 2013**, approving the adjusted strategy for Viet Nam’s transport development towards 2020, and the orientation towards 2030
2. **Decision No. 318/QD-TTg of March 4, 2014**, approving the strategy for development of transportation services through 2020, and orientations toward 2030
3. **Decision No. 1210/QD-TTg of July 24, 2014**, approving the Scheme on restructuring transport branch in service of the cause of industrialization, modernization and sustainable development until 2020
4. **Decision No. 3309/QD-BGTVT of October 24, 2016**, promulgating Ministry of Transport’s action plan on enhancing environmental protection in the transport sector in the 2016-2020 period
5. **Decision No. 4088/QD-BGTVT of December 12, 2013**, promulgating action plan of the Ministry of Transport on sustainable development for the period 2013-2020
6. **Directive No. 02/CT-BGTVT of February 18, 2014**, on actively responding to climate change, thrifty and efficient use of resources, enhancing environmental protection in the industry
7. **Prime Minister’s Decree No. 86/2014/ND-CP of September 10, 2014**, on business and business conditions of transport by automobile
8. **Decision No. 744/QD-BGTVT March 21, 2017**, approving the scheme restructuring the transport sector in 2016-2020 period and orientation to 2025. In this decision, the specific objectives for mode of transport are set out as follows:

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36 See Ministry of Transport’s Decision No. 1456/QD-BGTVT dated May 11, 2016 promulgating action plan to respond to climate change and green growth of the Ministry of Transport in 2016-2020 period.
ROAD TRANSPORT

a. Promote the advantages of road transport in the gathering, creating, transporting freight and passengers with short and medium distances; reduce the share of inter-provincial road and the share of other transport modes. By 2020, the output of inter-provincial road transport reached 599 million tons, accounted for 54.39% market share of inter-provincial freight, with the growth rate of 8.61%/year; the inter-provincial passenger transport reached 1,105 road passengers, accounted for 93.22% market share of inter-provincial passenger transport, with the growth rate of 9.19%/year.

b. Apply advanced technology to participate in transport business, enhance the quality of transport services coupled with reduced transport cost, promote the formation of large and medium units of transport, with the target: By 2020, reduce the number of empty-running automobiles from 3-5% of the cost of logistics; manage the transport service quality in accordance with the standards; and transport units offer passenger transport with the assurance of the registered service quality with focus on high-quality passenger transport.


d. Continue to promote the development of public passenger transport network by synchronous bus, compatibility among modes of transport in urban areas and from urban centers to the district towns of provinces and cities, from special urban areas to satellite urban areas and industrial areas. Develop and improve the quality of public passenger transport by bus. Have tailor-made roadmaps to control an increase in personal vehicles to reduce congestion.

e. Every year, reduce from 5-10% of traffic accidents, the death toll and the number of injuries caused by road transport vehicles.

RAIL TRANSPORT

a. Restructure rail transport in the direction assumed large-volume freight over long or medium distance; passenger transport at average distance or public passenger in big cities. Gradually increase the market share of rail transport on the main corridor and public passenger transport in Hanoi and Ho Chi Minh City.

b. By 2020, the output of inter-provincial rail freight transport reaches 47.77 million tons, accounting for 4.34% market share of inter-provincial freight transport, with the growth rate of 30.30%/year. The output of inter-provincial passenger rail transport reaches 40.02 million turns of passenger, accounting for 3.38% share of inter-provincial passenger transport, with the growth rate of 16.94%/year.

c. Raise the proportion of passenger trains departing and arriving on time, specifically: The proportion of trains departing on time reaches over 95%; and the proportion of trains arriving on time reaches over 90%.
d. Develop rail vehicles in the direction of modernness, rational power, fuel economy and efficiency.

e. Reduce rail price and cost, improve the quality of transport services to healthily compete with other modes of transport.

**SEA TRANSPORT**

a. Restructure the sea transport in the direction mainly undertaking import-export freight transport, international routes, coastal roads, particularly North - South transport, coal import transport to serve thermal power plants, crude oil transport to serve oil refinery, gas, liquefied petroleum gas, cement plants, etc.

b. By 2020, the output of inter-provincial freight transport by sea reaches 97.50 million tons, accounting for 8.85% market share of inter-provincial freight transport, with the growth rate of 13.30%/year. The output of passenger transport by sea reaches about 3.75 million turns of passengers, accounting for 0.06% market share in the passenger transport of the whole sector.

c. Develop the Vietnamese fleet in the direction of modernity and efficiency; attach importance to the development of heavy-weight specialized vessels. By 2020, the total load of the fleet reaches about 6.8 – 7.5 million DWT.

d. Raise the market share of the import-export freight transport to 25-30%. Develop the coastal and island passenger transport routes.

**INLAND WATER TRANSPORT**

a. Restructure inland water transport mainly in the direction of major bulk transport, super-long and super-heavy freight transport, forwarding transport in service of agriculture and rural areas; increase the market share of inland water transport, river water transport; and container transport on the main freight corridors.

b. By 2020, the output of inter-provincial inland freight transport by water reaches 356.62 million tons, accounting for 32.38% market share of inter-provincial freight transport, with the growth rate of 11.20%/year. The output of the inland water passenger transport reaches 2.00 million turns of passengers, accounting for 0.17% share of inter-provincial passenger transport, with the growth rate of 7.95% / year.

c. Improve the quality of inland water transport in the direction of enhancing the competitiveness, developing modern transport means with reasonable structure, suitable with the route condition, speeding up the water, reducing transport time and cost; prioritize the development of a container fleet; improve the loading capacity and warehousing services, especially for containerized freight transport.
d. Striving by 2020, the total tonnage of inland water freight transport vehicles will be around 26-30 million tons, the total number of seats of inland water passenger transport reaches about 750,000 seats, of which over 1,000 VR-SB vehicles will participate in river and sea transport activities.

e. Striving by 2020, about 160 cargo ports will be put into operation, the output of goods is approximately 92 million tons and 30 passenger ports will be put into operation, with over 30 million turns of passengers/year.

AIR TRANSPORT

a. Restructure air transport in the direction of developing air transport to become a popular and convenient mode of transport; undertake intermediate and long-distance passenger transport, international routes, transport of key economic regions, remote areas, sea areas and favorable freight and passenger air transport.

b. By 2020, the output of the inter-provincial freight transport by air reaches 0.489 million tons, accounted for 0.04% of the market share of inter-provincial freight transport, with the growth rate of 19.45%/year. The output of inter-provincial passenger transport by air reaches 38.34 million, accounted for 3.23% market share of inter-provincial passenger transport, with the growth rate of 15.99%/year. Increase the market share of international passenger transport by Viet Nam Airlines to 45.9%.

c. Promote the development of the air transport market, and striving to 2020, the air transport market of Viet Nam ranks the fifth in ASEAN.

d. Take advantage of the traditional market, combined with the promotion of air transport connectivity, and open new routes to regions of Europe, North America, Latin America and Africa. Have activities scheduled international operators to all international airports, increase frequencies on existing routes to all local airports.

e. Create a favorable and competitive environment for the operation of the airline. Enhance the competitiveness of Viet Nam Airlines towards the direction of modernizing the fleet, route network expansion and enhance the quality of service. Strengthen the control measures, reduce the rate of delayed flights, canceled flights of Viet Nam Airlines, reduce the rate of dissatisfied passengers on aviation services and non-aviation services over the years.

f. Ensure the absolute security and aviation safety.

The policies mentioned above are the bases for the implementation of Viet Nam’s green freight program. In addition, the policies and measures being promulgated in Viet Nam demonstrates the efforts put up by the Government, Ministries to attain a low carbon economy and sustainable and environmental friendly transport system, in general.
5.2. PROJECTS UNDERTAKEN

5.2.1. RESTRUCTURING THE TRANSPORT SECTOR: THE 2016-2020 PERIOD AND ORIENTATION TO 2015

On March 21, 2017, the Minister of Transport issued the Decision No. 744/QD-BGTVT, approving the project on restructuring the transport sector in 2016-2020 period and orientation to 2025. The project is based on two points.

Firstly, the restructuring of the transport sector is an important component of the restructuring of the transport sector, thus ensuring consistency and suitability with the contents of the transport sector restructuring project to serve the cause of industrialization and modernization up to 2020 approved by the Prime Minister in Decision No. 1210/QD-TTg dated July 24, 2014.

Secondly, the restructuring of the transport sector must be linked with ensuring the achievement of the objectives of the Transport Service Development Strategy up to 2020 with orientation to 2030 approved by the Prime Minister in Decision No. 318/QD-TTg dated March 4, 2014, aiming to develop harmonized and sustainable transport in the direction of modernization on the basis of maximizing the advantages of each mode of transport, improving service quality and reducing transport costs, traffic order and safety, the development of multimodal transport in the transport corridors, the urban public transport, and the international transport capacity.

The overall objectives of the project for the period 2020 are:

1. Focus on building and improving institutions, mechanisms and policies; Ensure the conditions necessary to restructure the transport force, promote socialization and encourage all economic sectors to invest in transport business.
2. Meet the diverse transport needs of the economy with a growth rate of the freight transport industry of 9.1%/year and the passenger transport industry of 10.7%/year.
3. Develop the transport market with reasonable structure towards reducing the share of road transport, increasing the market share of rail, sea, inland water and air transport, especially on the primary transport corridor with some specific targets to 2020 as follows:
   a. Market share of freight transport (inter-provincial): road accounts for 54.4%, rail accounts for 4.3%, inland water accounts for 32.4%, sea accounts for 8.85W and air accounts for 0.04%.
b. Market share of passenger transport (inter-provincial): road accounts for about 93.22%, rail accounts for 3.38%, inland water accounts for 0.17% and air accounts for 3.23%.

Meanwhile, oriented targets for 2025 are:

1. Basically improve the institutions, mechanisms and policies on management and development of transport. Continue to amend and supplement legal documents to meet the requirements of economic and social development in accordance with actual conditions.
2. Continue to improve transport market share by increasing market share of rail, inland water, air transport and reduce the market share of road transport.
3. Promote the development of multimodal transport on major transport corridors, especially the North-South transport corridor to the international gateway ports.

5.2.2. PILOT PROJECT OF GREEN TRANSPORT UNDER THE CORE ENVIRONMENTAL PROGRAM (CEP), PHASE II

The pilot project of green transport under the core environmental program (CEP), phase 2 (phase II) is funded by the Asian Development Bank (ADB), with co-financers such as the Government of Finland, the Swedish International Development Cooperation Agency, the Nordic Development Fund, and the Global Environment Facility.

It is deployed in 6 countries in the Greater Mekong Subregion (GMS): Viet Nam, Laos, Cambodia, Myanmar and Thailand for a three-year period, from 2012-2016. Its key target is to enhance the response to the climate change, improve the environmental quality, and develop the local livelihood in the GMS.

The objective of the project is to test measures that seek to cut emissions of greenhouse gases from the road transport.

The green transport project in Viet Nam which was implemented from 2015-2016 had the following components:

COMPONENT 1 - Green technology and finance: to identify and test green transport technologies with low investment cost and conduct research on assessing the financial mechanism to access the green transport technologies.
COMPONENT 2 - Eco-driving training: to improve traffic operations, in relation to fuel consumption. This component not only includes driver training and capacity building for teachers, but also includes assessing the management incentive plan and promoting the sustainable impact of the training.

COMPONENT 3 - Reduce empty shipments: to increase the average truck load factor and reduce emissions per ton/km.

Below are the results generated by the different measures applied:

1. Fuel-saving tire fitting: reduced fuel consumption by 4-6%;
2. Install aerodynamic equipment (windshield): reduced fuel consumption by 2-3%;
3. Pump 1 extra tire bar: reduced fuel consumption by 2%;
4. Eco-driving: reduced fuel consumption by 3-6%; Combining all measures: reduced fuel consumption and greenhouse gas emissions by 10-13% per vehicle and reduce 11-15 tons of CO₂ per year.

5.2.3. SUSTAINABLE FREIGHT TRANSPORT AND LOGISTICS IN THE MEKONG RIVER DELTA

The project “Sustainable freight transport and logistics in the Mekong River Delta” is funded by the European Union and the German government and implemented by the German Society for International Cooperation (GIZ). This project is being implemented in the countries of the Greater Mekong Subregion (GMS), including Viet Nam, Laos, Myanmar and Thailand for a three-year period from 2016 to 2019. The objective of this project is to pilot and apply measures to attain fuel efficiency.

The project has four components, namely the following:

1. Use fuel effectively: provide guidance and recommendations for the foreign experts on selecting the eco-driving training, construction criteria and training of driving training teachers, among others.
2. Transport of dangerous goods: give technical assistance and information on the guidelines and regulations of the national transport of dangerous goods; offer technical consultancy to review the evaluation guidelines and regulations of the national transport of dangerous goods, among others.
3. Financial access: provide support in terms of collecting and sharing information about the package, product of lease, bank loans, and financial institutions.

4. Policies: recommend policies and guidelines on green labeling

Based on initial results obtained by implementing the two projects, green technology such as eco-driving is effective in reducing greenhouse gas emissions. The difficulty however, lies on establishing research support mechanisms and enacting policies to promote the application and conversion of the fleet towards modernization and efficiency.

5.3. SPECIFIC MEASURES CARRIED OUT BY MINISTRY OF TRANSPORT

On a more detailed note, the Ministry of Transport has implemented the following measures toward green freight transportation:

1. Develop the infrastructure system of transport in the direction of enhancing resilience to climate change and reduce environmental pollution.
2. Set out objectives and solutions to cope with climate change and green growth in renovation and formulation of new development strategies and plans of transport.
3. Develop the transport system with the focal point.
4. Increase the investment in the highway system, highway network, inland water, rail, sea and air transport.
5. Promote the recycling and use of local raw materials and reduce environmental pollution in the maintenance of infrastructure.
6. Invest and upgrade the dry port system (ICDs).
7. Enhance the capacity through seaports.
8. Organize the container transport in a suitable way.
9. Manage the transport operations in the direction of low emissions, energy saving and efficiency.
10. Implement restructuring projects for transport sectors.
11. Promote the passenger and freight transport from road to other modes of energy-saving transport.
12. Promote the development of public passenger transport by bus.
13. Speed up the investment and put into operation BRT line and urban rail transport in Hanoi and Ho Chi Minh City.
14. Develop the logistics services.
15. Develop the transport exchanges.
16. Apply intelligent transport technologies and green transport technologies.
17. Promote the application of environment-friendly technologies; encourage the use of
renewable energy and clean energy in transport.

18. Apply science and technology in the construction, maintenance of infrastructure, operation and transport.

19. Complete the system of standards, processes and technical guidelines for the construction of transport infrastructure.

20. Develop, issue and apply fuel consumption levels for some vehicles.

21. Promote the use of biofuels and clean fuels.

22. Gradually eliminate ineffective and climate-unfriendly technologies, facilities and equipment.

23. Implement synchronous measures to control the emissions of motor vehicles.

24. Adopt emission standards level 3, 4, 5 for two-wheel motorized motorcycles and automobiles which are newly manufactured, assembled and imported.

25. Raise the emission standards for circulating and imported used motor vehicles.

26. Step by step control the emissions of motorcycles and automobiles participating in the traffic in big cities.

27. Popularize and raise awareness for organizations and individuals on climate change and green growth in transportation.

28. Build up, implement, diversify programs and communications, raise awareness of organizations and individuals about climate change, green growth and use of environmental friendly facilities and equipment in transportation activities; popularize, disseminate information to transport enterprises and drivers on measures for climate change mitigation such as restriction of personal vehicles, training eco-driving and green transport.

29. Organize training courses for staffs in order to exchange experiences and improve the capacity for climate change management, green growth in transportation sector.

30. Intensifying international cooperation and diversifying resources to implement the activities for climate change responses and transport green growth.

31. Signing, joining and implementing international treaties as well as international cooperation programs on climate change, green growth, energy saving and efficiency in transport sector.

32. Participate more frequently in forums, conferences, seminars, workshops and in collaboration with international organizations to improve the capacity for climate change management, green growth, to build up capacity for measuring-reporting-verification (MRV) and to research and implement Nationally Appropriate Mitigation Action (NAMA) in transportation.

33. Effective use of governmental budget (for science and technology, environment, climate change and green growth), in research and development, technology transfer and implementation of priority tasks in climate change response and green growth.

34. Take the initiative and maximize the concessionary resources for climate change, green growth from financial institutions and international donors.

35. Encourage financial institutions and enterprises to invest and implement the Action Plan.

36. Thus, the action plan of the Ministry of Transport has been clearly defined to readily promote the development of green transport.
6. ASSESSMENT AND RECOMMENDATIONS

The following are the identified advantages and difficulties/issue of implementing green freight development program in Viet Nam, based on stakeholder consultations and analysis of results from the survey:

ADVANTAGES

1. The government has set the development trajectory and formulated solutions in the implementation of green development. Likewise, the Ministry of Transport (MOT) has developed an action plan to develop and promote green transport. This presents an opportunity for the development and formulation of green transport policies.
2. The Green Freight Program was developed and made operational through online transport exchanges, more transparent freight transport transactions, and healthy competition among transport enterprises in Viet Nam.
3. Companies are cognizant of the application of green transport technologies and advanced management practices in fleet management to reduce transport costs and increase competitiveness.
4. A number of international organizations, such as Asian Development Bank (ADB), the World Bank (WB), GIZ and Clean Air Asia, have supported the transport sector with specific action programs, plans, and actions aimed at developing green transport in the region.

DIFFICULTIES

1. There is a lack of policies creating incentives for investments in green transport technologies.
2. Enterprises tend to be small and medium-sized, with limited financial capacity. There is also a lack of a credit mechanism to enable enterprises to borrow funds to upgrade their fleets. In addition, the large number of owner-operators is neither well monitored nor well managed.
3. While the first online transport exchange is now operational, shippers (particularly FDI enterprises) have not joined, limiting its efficiency.
4. Human resources personnel lack training and have not kept pace with the region’s level of expertise.
5. There is a need for significant infrastructure investment to promote the redistribution of some freight activities to other modes of transport aside from road freight transport.
Based on the thorough evaluation of existing information and analyses of data gathered from the survey, the following recommendations are made:

1. Establish mechanisms and policies:
   1.1. to encourage transport companies to invest in and use clean fuels and greener vehicles; to manage, monitor and improve the quality of owner-operator services and vehicles;  
   1.2. to attract shippers, particularly FDI enterprises involved in online transport trading;  
   1.3. to enable transport companies to loan money for investments in green transport technologies, fleet innovation, and the replacement of older, environmentally unsound trucks. These mechanisms should require carriers to submit freight performance data in order to qualify for loans, grants and other financial incentives; and  
   1.4. to develop and promote public-private partnership that collects, analyzes and shares freight performance data that details the energy and environmental efficiency of freight operations.  

2. Capacitate and train human resources to advance their knowledge in freight and improve the quality of transport management both regionally and globally.  

3. Strengthen communication and improve dissemination strategy to raise awareness on the benefits of green transport in the economy and the environment.  

4. Appeal to agencies and international organizations to provide support and cooperate with:  
   4.1. development of policies aimed at promoting general transport and freight transport towards low-carbon emissions and environmental sustainability;  
   4.2. testing of green transport models;  
   4.3. exchange of experiences on the development of green transport; and  
   4.4. information-sharing and best practices on existing global green freight efforts, programs and policies.
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